Integrating a FIMT geodatabase with ArcGIS Online & Collector

VERSION 3.1

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Access the digital copy of this Workflow & supporting videos

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READ ME

It is strongly recommended to familiarize yourself with ArcGIS Online, Collector, and this Workflow before attempting on an incident. Allow yourself plenty of time going through the document start to finish. Videos can be viewed before starting this document &/or throughout the process.

This document is not just a tutorial. It provides <u>recommended</u> steps for managing your incident's FIMT geodatabase, Other geodatabase, AGOL feature services and maps, and use of the Collector App. The workflow will help you keep data in sync between these different platforms. Modify steps and maps you make to meet the unique situation of your team and incident.

The templates you use while practicing this workflow will be used on an actual incident too. You will be introduced to key AGOL & Collector concepts. Self-motivation is required, if you don't understand something, do an Internet search and dig deeper.

**When you are using this workflow as a tutorial, you need to make a 'practice' FIMT incident and make up your own fire data.*

*For questions/comments/feedback/issues please contact: wildfireresponse@gmail.com

1 Introduction

1.1 Objective

This is a wildland fire mapping pilot-project that utilizes ESRI's ArcGIS Online (AGOL), a web mapping platform, and Collector (10.3), an application for mobile devices (iOS 7 or later and Android 4.0 or later). The workflow in this document covers the steps on how to use a Fire Incident Mapping Tool (FIMT) geodatabase (gdb) with AGOL.

What this technology brings to the table:

- **Real-Time Data Sharing**: Users of Collector will be able to share their data in a real-time manner in connected environments. This will be beneficial for the GIS Specialist (GISS) managing the maps & data and other Incident Management Team (IMT) members will benefit from being able to view these near real-time updates.
- **Offline Collection**: The ability to view maps and collect data when there is no cellular service or WiFi. When a device establishes connectivity, changes in a map can be manually sent and received (synchronization/sync).
- **Security**: Permissions will be given to only select individuals to view and add spatial data to maps. AGOL accounts are required to use Collector and can be issued when needed.
- **Paper Map & Printing Reduction**: Being able to view the most up-to-date maps on a mobile device reduces the amount of paper maps needed.

This document contains a suggested workflow. The goal of this process is to develop a secure and seamless way to share maps with the different types of viewers & users (IMT personnel vs Public). It is also a workflow to allow the GISS to organize and manage: incoming data (QA/QC), the FIMT gdb, users, and permissions.

1.2 Description

There are two main parts to this document:

1.2.1 Getting Started - **AGOL** *:: Getting* started & **Collector** *:: Getting* ***started***

- If you are not proficient with AGOL &/or Collector this is where you need to start. Watch the videos and read up on AGOL and Collector capabilities and processes.

1.2.2 Workflow

- Here you will go through the process of how FIMT can be integrated and managed with AGOL and Collector.

1.3 Target Audience

GIS Specialists on wildland fire incidents.

1.4 Requirements

1.4.1 Need to be an experienced user of ArcMap

- ArcMap version 10.1 or higher (10.2 is strongly recommended)

1.4.2 Experienced using the Fire Incident Mapping Tool (FIMT)

- Download the tool and documentation here[1]
- FIMT contains many features that are not necessary for map creation in this workflow. The features that will be used from the FIMT gdb are: FirePolygon, FirePoint, FireLine, & AssignmentBreaks

1.4.3 AGOL Organizational Account

- This is different from the free-Public Account that anyone can get (more details: 2.1)

1.4.4 Templates[2] folder (Section 11.1)

- Save in the fire incident directory **documents** folder

**This workflow was developed with ArcMap 10.2. It should work with 10.1, but issues may be encountered in 10.1 and not 10.2 or 10.3.*

1.5 QA/QC Process – How data added through Collector is approved

1.5.1 Work with your Situation Leader (SITL) to develop the process of how data is approved and integrated into the FIMT gdb as it is collected.

1.5.2 Integrate GSTOP standards into this process: GSTOP page 57 – Communications.AGOL :: Getting started

1 gis.nwcg.gov/links_tools.html
2 https://goo.gl/OSr4MT

2 AGOL :: Getting Started

This section introduces the components that will be necessary to create a map in ArcGIS Online (AGOL). These maps will be able to be shared and used with Collector in connected and disconnected (Offline) environments.

*Overview Video of this Workflow[3]

ArcGIS Online Video Series[4]

2.1 Get an AGOL Account

- This account is different from the free Public Account you may have used before.
- Request an account: click HERE[5] or Email: WildfireResponse@gmail.com

2.2 Different roles for AGOL accounts

There are different roles that AGOL account holders are assigned. As the GISS you will create AGOL accounts for any of your team members that you want to provide access to the AGOL maps. Listed below are the roles and the basic functionality: (View appendix 11.4 for more detail)

- GISS Role: The GISS will be assigned as a GISS role (similar to administrator). This allows the GISS to create new AGOL accounts, publish feature services, and create Groups.
- Operations Role: Can view and edit maps in Collector
- Data Viewer Role: Can only view maps in Collector

2.3 Sign In to an Organizational account: Sign-In[6]

- Video: Join an organization[7] (start at 59secs) This will give you the general idea.

2.4 Feature Layer / Feature Service

"The feature service/layer authoring process involves setting up a map document to define the data and symbology that will be maintained in AGOL" (ESRI Resources). Once the feature service is published from ArcMap it can be utilized to create AGOL maps.

"Hosted feature layers support vector feature querying, visualization, and editing. Hosted feature layers are most appropriate for visualizing data on top of your basemaps. In web apps, hosted feature layers are drawn by the browser and support interactive highlighting, queries, and pop-ups."

NOTE: You may see the terms *feature service* and *feature layer* treat them the same.

3 https://goo.gl/OSr4MT
4 http://video.arcgis.com/series/18/arcgis-online
5 http://nifc.maps.arcgis.com/home/index.html
6 http://www.arcgis.com/home/signin.html
7 http://video.arcgis.com/watch/1338/joining-an-organization

2.4.1 **Publish** a feature layer from ArcMap

- Videos:
  - Video[8]: (start at minute 5:30) **OR**
  - *Publishing a Feature Service*[9]: (start at minute 6:24 through ~minute 12)

2.4.2 **Create** a feature layer using the *service definition* file (.sd) **(An .sd file is provided and is the recommended method)**

2.4.3 In AGOL modify feature layer settings – Steps necessary to use your map Offline in Collector.

- Enabling a map to go offline: Take maps offline[10]

2.5 Creating AGOL Maps

In AGOL a new map can be created (My Content > **Create Map)**. Add a feature layer to this new map (Add > Search for Layers [In: My Organization]). Next modifications to the item details, pop-ups, & sharing will occur.

- Video: Create a Map[11]
- Tutorial: Create and Share a Collector Map[12]

2.6 Sharing / Groups

AGOL maps can be shared as a map in Collector and as a Web Mapping Application. You can share maps with groups, your organization, or the public. *Share the map with a group. Then make sure all the Collector users that you want using this map have been invited to the same group. If necessary create a group.*

There are five different groups that will need to be setup in AGOL. The following are the different groups and naming convention:

IMT Groups: <GACC> <IMT name or number> - <group purpose>

1. RM Pechota - **Archive** (for any maps/apps/data that aren't for the current incident)
2. RM Pechota - **Mobile Editing** (this group would include all services and maps for use in collector)
3. RM Pechota - **Public Information** (can be used by LOFR's)
4. RM Pechota - **Working** (data/maps used by GISS)
5. RM Pechota - **Viewer** (apps/dashbaords that can be used by C&G, support, logistics, etc)

2.6.1 Videos

- Groups: Invite Others to Join Your Group[13]
- Sharing: Share Maps & Aps with your Org[14]

2.6.2 Tutorials

- Groups: What is a Group[15]
- Sharing: Share Maps[16]

8 http://www.youtube.com/watch?v=uhE3Jx9MKwQ
9 http://www.youtube.com/watch?v=K19U_HFdooc
10 http://doc.arcgis.com/en/collector/ios/create-maps/offline-map-prep.htm#ESRI_SECTION1_BB7CFF5BFBC847DEA31610A38A510679
11 http://video.arcgis.com/watch/253/create-a-map
12 http://doc.arcgis.com/en/collector/ios/create-maps/create-and-share-a-collector-map.htm
13 http://video.arcgis.com/watch/251/invite-others-to-join-your-group
14 http://video.arcgis.com/watch/1341/share-maps-and-apps-with-your-organization
15 http://doc.arcgis.com/en/arcgis-online/share-maps/groups.htm
16 http://doc.arcgis.com/en/arcgis-online/share-maps/share-maps.htm

2.6.3 Embed a map into a website[17]

- This is how you copy the map applications html code for sharing

2.6.4 Create Map Apps[18]

2.7 Syncing data between AGOL and ArcMap

Once changes come in from Collector you will need to sync up your gdbs and feature service.

- Section 6.7 for more details
- This is a good read[19] to show different ways of getting feature layers back to ArcMap.

2.8 Additional Resources

- Videos[20]
- Tutorials[21] (Explore: Use, Create, & Share sections)

3 Collector :: Getting started

In this section you will learn how to use the maps you create in AGOL with the Collector App. The interface differs slightly between iOS and Android.

*Quick Reference[22] *Overview Video of this Workflow[23]

Install the Collector Application

- On your mobile device, go to the App store[24] and search ***Collector for ArcGIS***. **Install.**

3.1 Sign In to Collector

- Open Collector. Enter your username & password. (for details see 2.1)

3.2 Using the Maps

A. The GISS must first share the map with a Group in AGOL. Only the members of the Group can view the map in Collector.
B. Viewing maps: Once signed in, you will be in the Map Gallery. **Tap** the map you want to open.
C. Downloading maps for *Offline* use: Maps that have had their settings configured correctly will have the option to be downloaded for Offline use. In **All Maps** tap: **Download** *(Android)* or *(iOS)*, for the map you choose. (Tutorial: Go Offline[25])
    1. Pick a Basemap and the level of map detail. You will need to select:
    2. the Work Area: the box identifying your bounding N/S/E/W extent
    3. and Choose Map Detail: the largest scale you can view (e.g. 1:18,000 is the largest scale for a Topo map and Ortho is good to about 1:4,000)
D. Collecting data and editing:
    - Add a new feature by using the **Collect New** tool. By default the feature is placed at your current location. Tap the map symbol to view and move the new feature to a

17 http://video.arcgis.com/watch/249/embed-a-map-in-your-website
18 http://doc.arcgis.com/en/arcgis-online/create-maps/create-map-apps.htm
19 https://esriaustraliatechblog.wordpress.com/2014/05/30/bringing-your-data-from-the-cloud-back-to-earth-how-to-extract-your-data-from-arcgis-online/?blogsub=confirming#subscribe-blog
20 http://doc.arcgis.com/en/arcgis-online/reference/videos.htm
21 http://doc.arcgis.com/en/arcgis-online/
22 http://doc.arcgis.com/en/collector/ios/collect-data/quick-reference.htm
23 https://drive.google.com/folderview?id=0B4FY6Y_ZXT8tVlFGTklkS3g3Tjg&usp=sharing
24 https://itunes.apple.com/us/app/collector-for-arcgis/id589674237
25 http://doc.arcgis.com/en/collector/android/collect-data/offline-use.htm

different location in the map. Fill out the **Collect Attributes** **table**, then tap **Done** *(Android)* or **Submit** *(iOS)*.

- Video[26]
- Tutorial[27]
- Lines and polygons can be collected while moving using the **Streaming** option. Tap 'Collect a new feature'. Select a line/polygon type to add, go to the map, tap **STREAM**. Collection parameters can be adjusted with the **Collect settings** icon. When collection is complete tap **Done** or **Submit.**

E. Sync/Synchronization: This manually sends edits made within Collector up to AGOL and updates made by others are added to your map.

- When connectivity is established go to the **All Maps** page and tap the **Sync** button to send your edits and receive any updates. You will see the number of changes next to **Sync(6)** (*in Android*) and *(in iOS).* This represents the number of edits/changes you performed. During the sync process you will receive any updates that have been synced from another map.

3.3 Additional Resources

- Overview of using Collector with iOS: video[28]
- Tutorials[29] (Explore: Create Maps & Collect Data)

26 http://video.arcgis.com/watch/2194/collector-for-arcgis-damage-assessment-survey
27 http://doc.arcgis.com/en/collector/ios/collect-data/collect-tutorial.htm
28 https://www.youtube.com/watch?v=5nmkHKNs0Ek
29 http://doc.arcgis.com/en/collector/ios/create-maps/create-maps.htm

4 Templates

This workflow utilizes an incident's master FIMT geodatabase, an OTHER geodatabase, ArcGIS Online, and Collector. The GISS will keep the hosted feature layer in AGOL synchronized with the layers in the master FIMT and Other geodatabases.

- You will start this workflow by downloading a copy of the templates folder (you should have these already since you are reading this document). Check for updated copies here.[30]
  The folder contains:

  2014_GSTOP_Folder_Template – *File directory structure required by GSTOP*

  LayerFiles – *Unique symbology used in AGOL*

  Tools – *Automation tools used throughout the workflow* (See Appendix 11.5 for details)

  Tutorials – *Additional ESRI materials for familiarizing yourself with AGOL & Collector*

  YYYY_IncidentName_IncidentNumber_OTHER_Arc10.gdb – *Template file geodatabase that can be copied and store non-FIMT fire related data*

  AGOL_PUBLICservice_YYYY_IncidentName_IncidentNumber.mxd – *Template mxd that can be used to create a Public feature service*

  AGOL_IMTservice_YYYY_IncidentName_IncidentNumber.mxd – *Template mxd that can be used to create a feature layer for IMT AGOL maps (not Public)*

  AGOL_IMTservice_YYYY_IncidentName_IncidentNumber.sd - *File that can be added to your AGOL account to create a feature layer*

  Workflow-v3.pdf – *This document*

- Save the templates folder to the incident **documents** folder.
- Rename the files you will use (mxds, SD file, etc)
- The mxds and gdb are setup in WGS84. Feel free to change the projection to a local one.

30 https://drive.google.com/folderview?id=0B7hZirKOyVy3fkdiY2tabkFFYmw4c0x2R2htRXNUTVBkZFQxWnFnOXRtNW9ud0EzSkpyX0k&usp=sharing

5 Workflow Overview

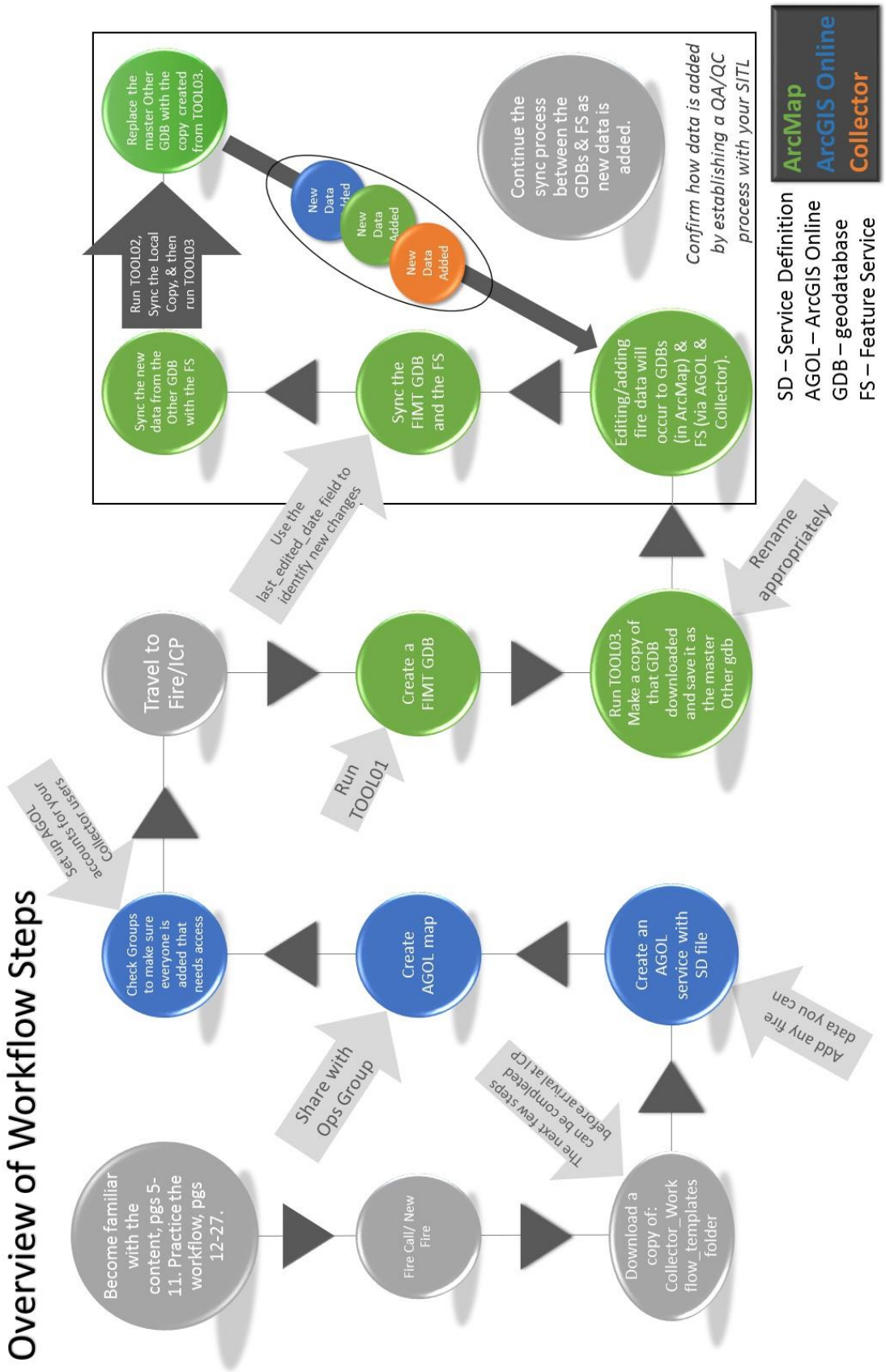
These are the main steps that you will be completing in Section 0.

Steps completed in **ArcMap** are highlighted in this green color throughout the workflow. This was done to help clarify when you are working in ArcMap or AGOL

5.1 GISS Workflow Overview

1. *Before leaving for a fire you can complete steps 2-9 (this will allow Operations folks to start collecting fire data immediately)*
2. **Sign In** to AGOL
3. **Create** the feature layer by uploading the service definition provided (AGOL_IMTservice_YYYY_IncidentName_IncidentNumber.sd)
4. **Update** the feature layer *item details* with specific fire information
5. **Create** the IncidentName_IMT map for folks heading to the fire
6. **Add** whatever spatial data you may have (fire location from Resource Order)
7. **Save** & **Share**.
8. Check **Groups** to make sure everyone is added that needs access to each particular group.
   - Operations personnel that have edit rights will be able to immediately start collecting and sharing fire line intelligence before the GIS shop is ever set up.
9. Create tpk(s) to be side loaded as basemaps
10. *Arrive to the fire/ICP*
11. Create FIMT geodatabase
12. Run TOOL01
13. Run TOOL03 to create the master Other gdb. The tool downloads a copy (as a gdb) of the feature layer you created in step 3. You will take a copy of this gdb and use it as the master Other gdb.
14. Keep the FIMT gdb, Other gdb, and feature layer synced

Figure 1


Overview of Workflow Steps
Become familiar with the content, pgs 5-11. Practice the workflow, pgs 12-27.
Fire Call/ New Fire
Download a copy of: Collector_Workflow_templates folder
Check Groups to make sure everyone is added that needs access
Create AGOL map
Create an AGOL service with SD file
Set up AGOL accounts for your Collector users
Share with Ops Group
The next few steps can be completed before arrival at ICP
Add any fire data you can
Travel to Fire/ICP
Create a FIMT GDB
Run TOOL01
Run TOOL03. Make a copy of that GDB downloaded and save it as the master Other gdb
Rename appropriately
Use the last_edited_date field to identify new changes
Sync the new data from the Other GDB with the FS
Sync the FIMT GDB and the FS
Editing/adding fire data will occur to GDBs (in ArcMap) & FS (via AGOL & Collector).
Run TOOL02, Sync the Local Copy, & then run TOOL03
Replace the master Other GDB with the copy created from TOOL03.
New Data Added
New Data Added
New Data Added
Continue the sync process between the GDBs & FS as new data is added.
Confirm how data is added by establishing a QA/QC process with your SITL
SD – Service Definition
AGOL – ArcGIS Online
GDB – geodatabase
FS – Feature Service
ArcMap
ArcGIS Online
Collector

6 Workflow

6.1 Getting Setup Locally

Start by saving files to the correct location in the GSTOP file directory structure.

6.1.1 Have the file incident directory structure set up now. A template is provided:
2015_GSTOP_Folder_Template

6.1.2 Save CollectorPilot_Workflow_Templates into the **documents** folder. (Figure 2)

6.1.3 If you have not already created the master FIMT gdb for your incident, create one now.

6.1.4 Run **TOOL01** on the FIMT gdb. Find this in: CollectorPilot_Workflow_Templates > Tools > WorkFlow_Tools.tbx > TOOL01. It will do a few modifications to the FIMT gdb schema.

A. *Editor tracking is enabled: 4 extra fields are added: created_user, created_date, last_edited_user, and last_edited_date. These are automatically populated whenever an addition or modification is completed.*
B. *Latitude/Longitude fields are added: These fields store coordinates in degrees decimal minutes (DDM). You will run a tool to populate these fields. Collector only displays Latitude/Longitude in decimal degrees. This is our work around.*

6.1.5 Edit/add fire data to the FIMT gdb

6.1.6 Make copies of the following (& rename), save in the **incident_data** folder:

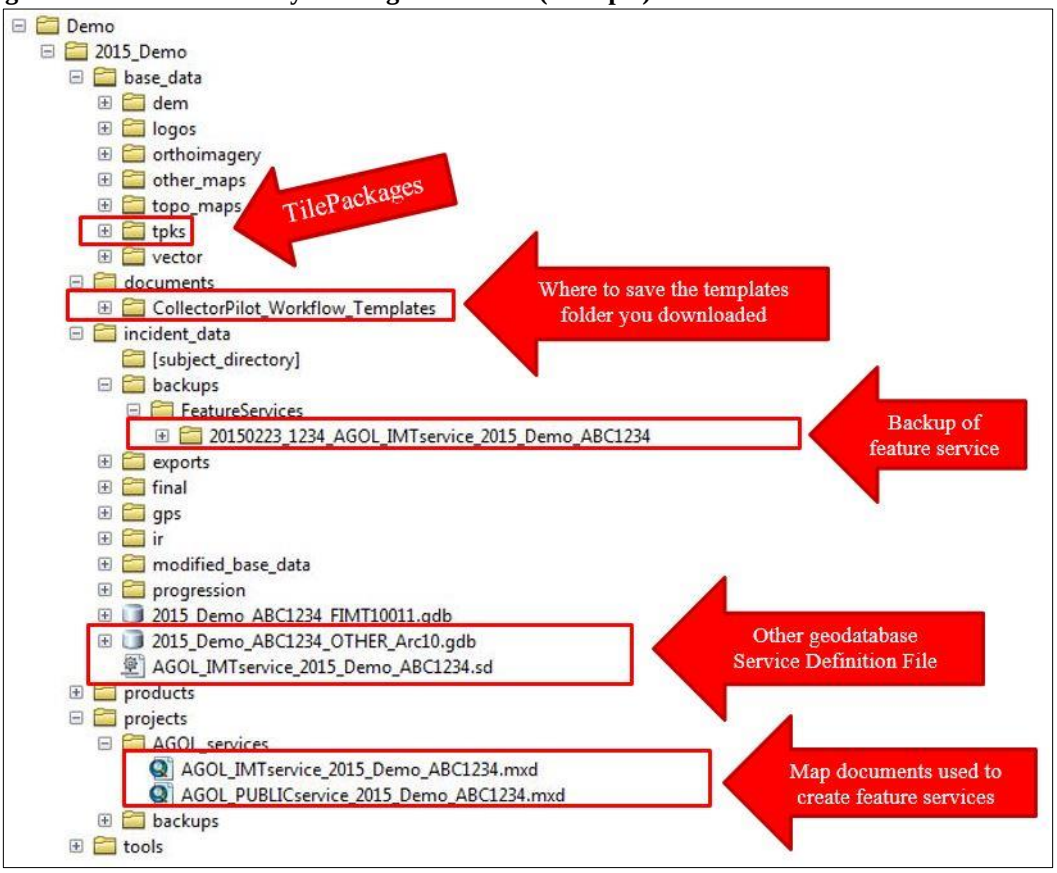
- AGOL_IMTservice_YYYY_IncidentName_IncidentNumber.sd

6.1.7 Make a copy, save in the **projects** folder, and rename:

- AGOL_IMTservice_YYYY_IncidentName_IncidentNumber.mxd
- AGOL_PUBLICservice_YYYY_IncidentName_IncidentNumber.mxd

6.1.8 You will create your master Other gdb in 6.3, after you create the feature service.

Figure 2: Incident Directory Catalog File Names (example)



6.2 Create the Feature Service

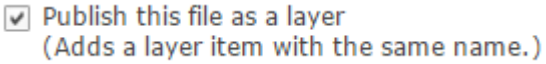
There are two ways to create a feature service. It is recommend to create it with the service definition file (6.2.1). The other option is to use ArcMap to create the feature service (6.2.2). You should know how to do both options.

6.2.1 **Option #1**: USE A SERVICE DEFINITION (.sd) FILE TO CREATE A NEW FEATURE SERVICE

A. In a web browser, **Sign In** to your AGOL account.

B. Go to **MY CONTENT** > + Add Item > **From my computer** > Browse to the .sd file you renamed and saved under incident_data in section 6.1.6.

C. While the .sd file is uploading a feature service is automatically created from it when this box is checked:



D. Once the upload is complete, update the new feature service's information – Go into its **item details** and update the Title, Summary, Description, Tags….

E. Now you can create an AGOL map and populate data into the feature layer. (Continue at 6.3)

6.2.2 **Option #2**: PUBLISH A NEW FEATURE SERVICE FROM ARCMAP

A. Open AGOL_IMTservice_YYYY_IncidentName_IncidentNumber.mxd
B. Repoint layers to the gdb in the templates folder: YYYY_IncidentName_IncidentNumber_OTHER_Arc10.gdb
C. Fill out/modify the Map Document Properties:

Figure 3: Access Map Document Properties

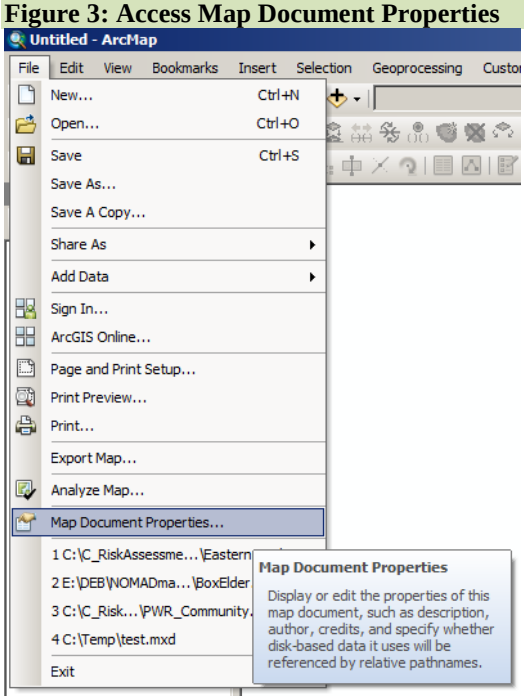
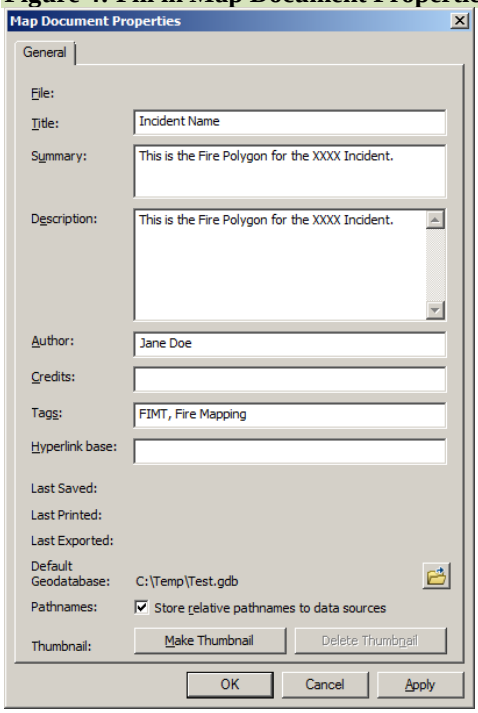


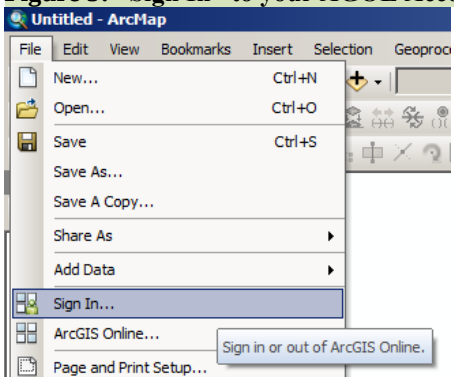
Figure 4: Fill in Map Document Properties Form



D. In ArcMap, **Sign In** to your ArcGIS Online account

> **NOTE:** For *Sign In* issues see Appendix 9.1.5

Figure 5: "Sign In" to your AGOL Account. Enter your Username & Password when prompted.



E. Publish your feature service: **Figure 6** thru **Figure 13**. (Your mxd needs to be in **Data View** not Layout View)

Figure 6: In the mxd you just set up: File > Share As > Service…

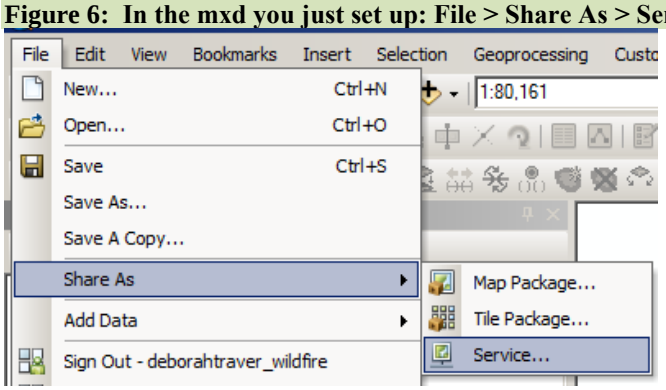


Figure 7: For a new feature service, choose "Publish a service". Click Next.

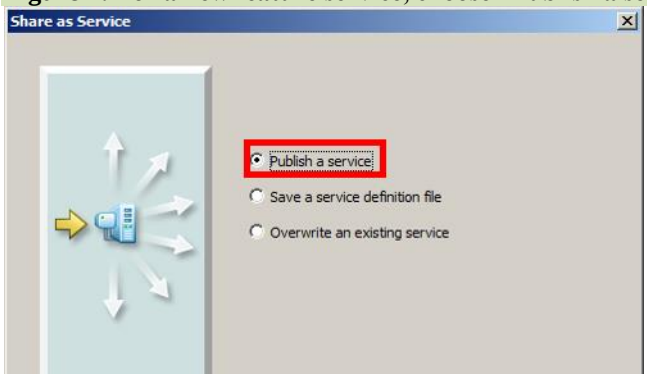


Figure 8: Name the service (default is the name of the mxd). Click Continue.

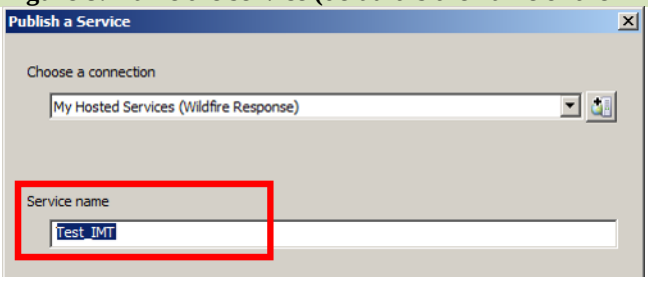


Figure 9: Select Feature Access and UNCHECK Tiled Mapping

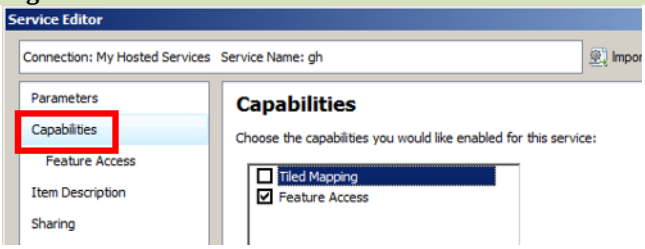


Figure 10: Under Feature Access ☑ check: Create, Update, Delete, Query, and Sync (Appendix 11.3 for details about Operations Allowed)

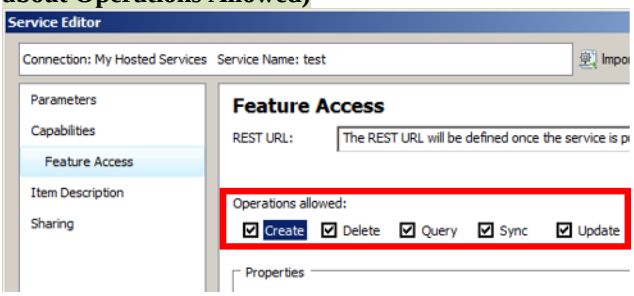


Figure 11: Enter Summary, Tags, & Description. Information already included comes from Map Document Properties (Figure 3).

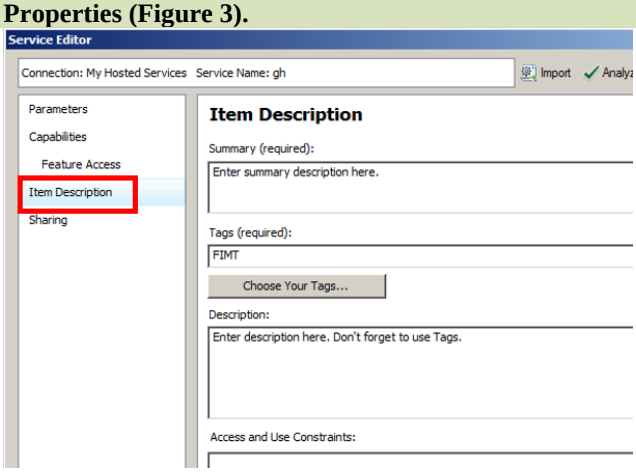


Figure 12: Sharing with groups can be now or later in AGOL.

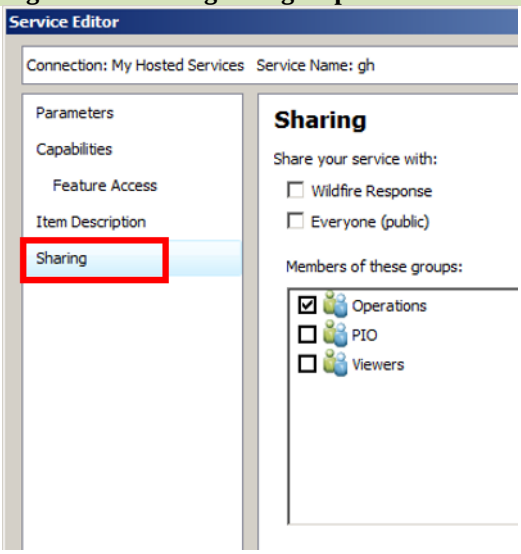
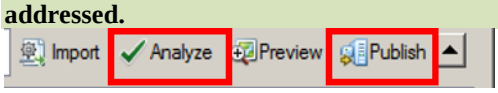


Figure 13: Analyze & Publish the feature service. It is ok to ignore warnings. High warnings need to be addressed.



F. Now you can create an AGOL map and populate data into the feature layer. Continue to the next section.

6.3 Create the master Other gdb

Once the feature service is created you can complete the following process to create the master Other gdb.

A. Run: WorkFlow_Tools.tbx > TOOL03-ReplicateService
   - This tool creates a backup of your feature service to your local hard drive. The output is a zipped folder with a date and timestamp.

B. Go to the location where you saved the backup and **unzip** the folder. The backup will have a crazy name (e.g. bc44dfa9acd1486d9e178c8c8fc87b2b.gdb).

C. **Copy** & **Paste** the gdb into your **incident_data** folder

D. **Rename** using this convention: YYYY_IncidentName_IncidentNumber_OTHER_Arc10.gdb

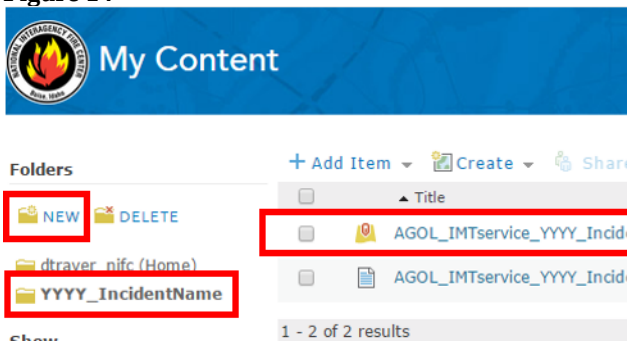
NOTE: When adding Other feature classes to an mxd use the layer files provided to symbolize.

6.4 Feature Service in AGOL

View and modify settings for the new feature layer in ArcGIS Online.

6.4.1 **Sign In** to your AGOL Organizational Account: Sign-In[31]

Figure 14



A. Feature layers you create initially appear under the **My Content** section of your AGOL account.
B. Create a new folder (YYYY_IncidentName) and move the new IMT service there.
C. If you create a Public Service for public maps, don't move that feature layer from the root. It needs to stay where it is so it can be overwritten.

6.4.2 Tour of a feature layer – what you need to know:

Figure 15: Access the feature layer item details via the arrow, 'View Item Details'.

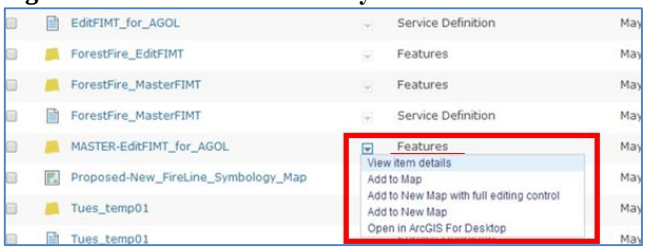
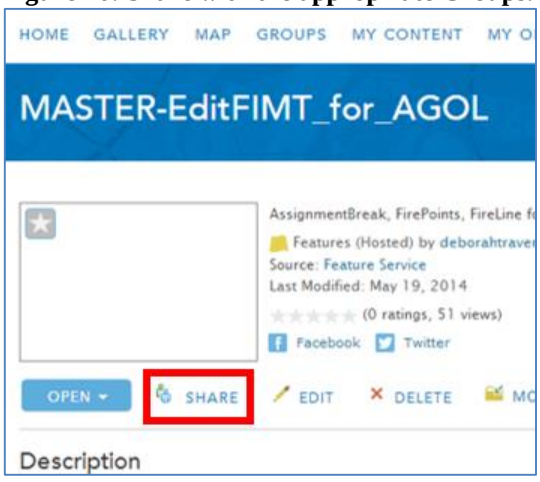


Figure 16: Share with the appropriate Groups.



31 http://www.arcgis.com/home/signin.html

Figure 17: You can edit the Title, Summary, and Description.

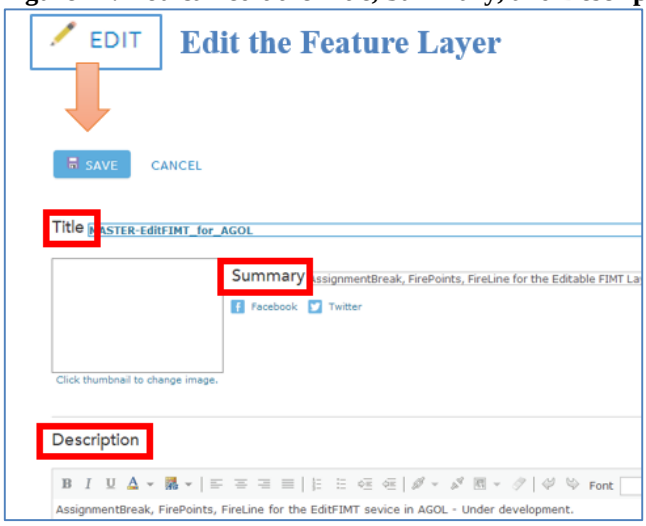


Figure 18: This is where you can enable or disable 'Editing' & 'Sync'. There must be one layer in a map with Sync enabled in order for it to go Offline in Collector.

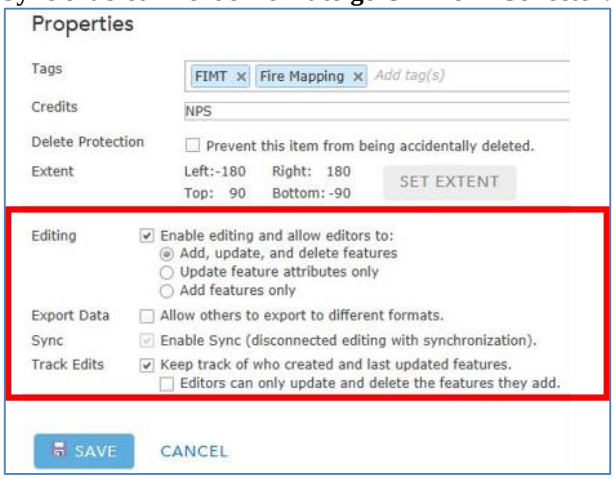
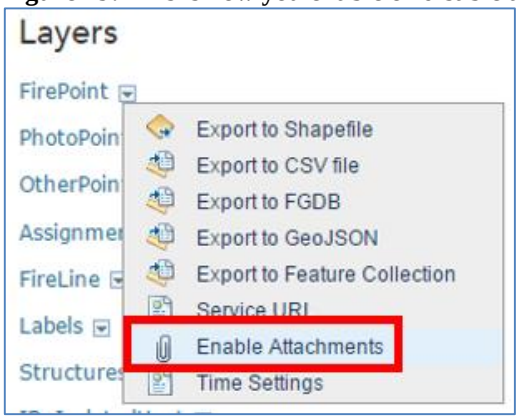


Figure 19: This is how you enable or disable attachments in AGOL. Attachments are enabled already.



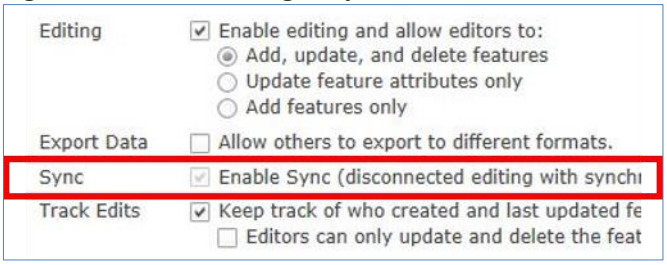
6.4.3 In AGOL modify your feature service **Item Details**:

A. **My Content** > AGOL_IMTservice_YYYY_IncidentName_IncidentNumber:

Item Details:

- Click EDIT
- Enable **Editing** & **Sync**
- Share with the appropriate group(s). Create a group if necessary.
- **Track Edits** should already be enabled

Figure 20: Enable Editing & Sync



NOTE: An AGOL map must have at least one layer sync-enabled to be used Offline in Collector.

6.5 Setting up Maps in AGOL

Once a feature service is created and configured you will be ready to create an AGOL map. You can create an Operations map for incident use &/or a Public map for the public to view.

6.5.1 IncidentName – IMTname – The first AGOL map you will create.

This map is intended to be shared with the IMT group. Some users in this group will be able to add/modify data while others will just be viewers. The way an IMT member can use the map depends on the role they were assigned.

A. Go to **My Content**. > Click Create Map

B. **Add**: "AGOL_IMTservice_YYYY_IncidentName_IncidentNumber" to the map

- **Add** one additional Basemap as a layer: **Add** > Search for Layers [In: ArcGIS Online] > Find: *USA Topo Maps (for export)*
- **Select***: Imagery with Labels* as the Basemap

C. **Rename** Layers (Drop the first part of the name), so they look nice in the table of contents

D. Reference the table below and incorporate suggestions

E. **Add** bookmarks so users can easily navigate to different extents of the fire (e.g., different Divisions or areas of interest)

F. **Save As** and **Name** your map (IncidentName_IMTname)

NOTE: Any unnecessary layers can be removed from an AGOL map once the feature service is added. You can customize your maps as you see fit.

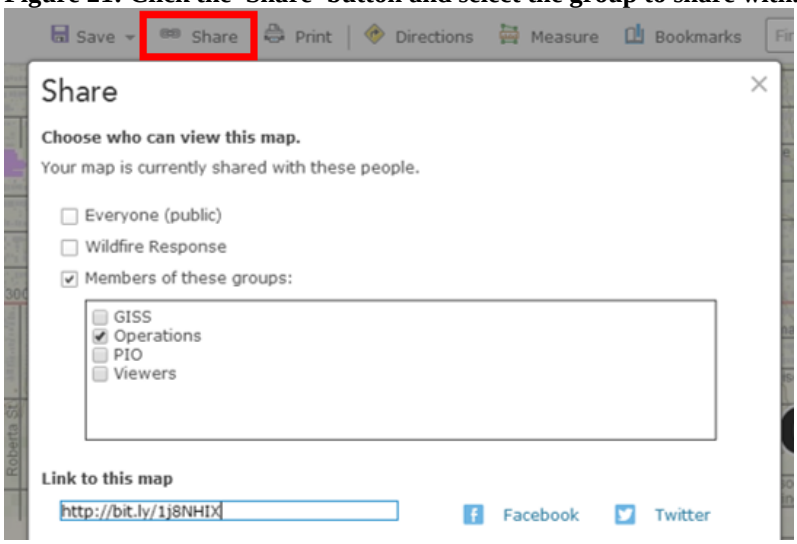
Table 1: Ordering & Settings for Contents (TOC) in AGOL

Layers (Note some are checked off by default)	Disable Editing	Transparency	Source & Other Options
☑FirePoint			IMT Service, Create Labels
☑PhotoPoints_MapNotes			IMT Service
☑OtherPoints			IMT Service
☑AssignmentBreak			IMT Service
☑FireLine			IMT Service
☑Labels	X		IMT Service , Hide in Legend, Remove Pop-Up
☐Structures			IMT Service
☑IR Isolated Heat	X		IMT Service
☑IR IntenseHeat	X		IMT Service
☑IR ScatteredHeat	X	25%	IMT Service
☑IR HeatPerimeter	X		IMT Service
☑TFR	X		IMT Service, Remove Pop-Up
☑FirePolygon	X	50%	IMT Service, Remove Pop-Up
☐OtherPolygon	X		IMT Service
☐RehabPoints			IMT Service, Create Labels
☐Rehab Lines			IMT Service
☑Retardant Avoidance	X		AGOL Layer
☑USA Topo Maps (for Export)			AGOL Layer
Imagery w Labels			Basemap

You can configure pop-ups and disable editing for the Latitude Longitude fields.

G. **Share** the map with the IMT group (create a new group if needed)

Figure 21: Click the 'Share' button and select the group to share with.



H. Check the settings of the map and make sure it is set for Offline use.

Figure 22: Go to the maps 'item details' to check which properties are enabled.

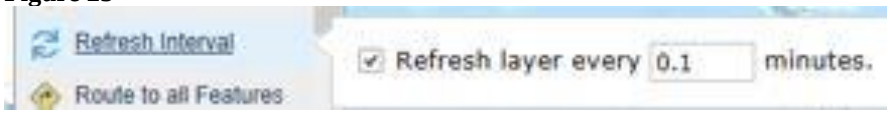
I. Optional: **Add** Directions

J. Optional: **Add**: US Forest Service Aerial Fire Retardant Avoidance Areas

NOTE: this layer & Directions layers will disable maps from going Offline.

K. Optional: **Set** a refresh interval for any of the layers in the map. In the table of contents, click the arrow next to a layer.

Figure 23



6.5.2 IncidentName Fire – Public Map - (Give an intuitive name) *Viewing map for the public.*

*A different process is used to update the data in a Public map because this type of map will not be used Offline in Collector.*Open the map template provided:

AGOL_PUBLICservice_YYYY_IncidentName_IncidentNumber.mxd

A. Repoint the layers to your master gdbs
B. Publish as a new feature service
   - For the Feature Access option (Figure 10) only check: ☑Query
C. Once the service is published go to your AGOL account and create a new map
D. In AGOL **Add**: AGOL_PUBLICservice_YYYY_IncidentName_IncidentNumber
E. **Disable** pop-ups for all layers except FirePolygon (this pop-up could show the fire name). *Re-enable pop-ups you see useful or create labels.*
F. Choose a Basemap (Topographic or Streets)
G. Optional: Imagery / Topo (**add** as layer)
H. **Sharing**: Everyone (Public)
I. **Create** a web mapping App & share URL (Section 2.6.3 & 2.6.4)

Table 2: Ordering & Settings for Contents (TOC) in AGOL

Layers	Transparency	Source
☑Controlled Fire Line		IMT Service
☑Uncontrolled Fire Edge		IMT Service
☑Closure Points		IMT Service
☑OtherPolygon	25-50%	IMT Service
☑FirePolygon	50%	IMT Service
Streets		Basemap

J. Updating the public feature service:
   - Use the same mxd you used to create the public feature service
   - As the master FIMT & Other gdbs are updated, republishing the public feature service will be necessary
   - Open the public mxd > File > Share As > Service….
   - The 'Share as Service' window will come up. Choose the third option 'Overwrite an existing service' (Figure 24)
   - Select the service to overwrite (Figure 25)

Figure 24

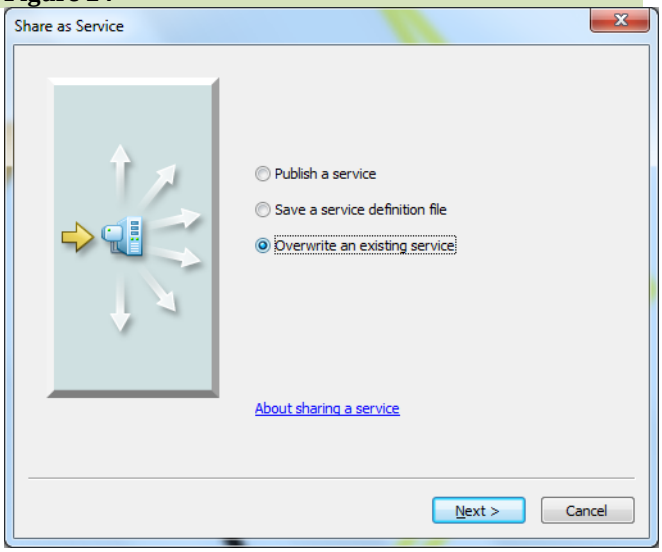
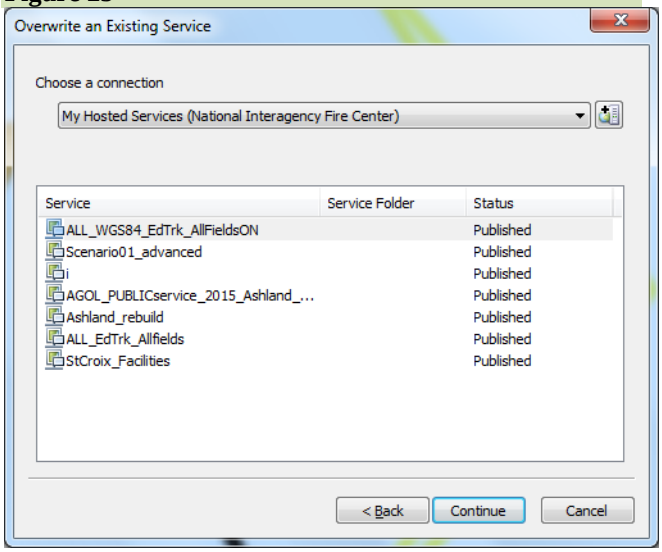


Figure 25



- The feature service in your public map should now be updated
- Repeat this process as often as necessary

NOTE: The steps described in sections 6.5.1/6.5.2 are for a map that would be used by Data Editors (Operational folks who will have privileges to add/edit data) and shared with the Mobile Editing group. Modify the map as necessary for use in other groups. You will want to do a *Save As*, give a new name, share with the appropriate group, and modify the map settings (disable editing, remove layers, etc….).

6.6 Sharing Maps for use in Collector

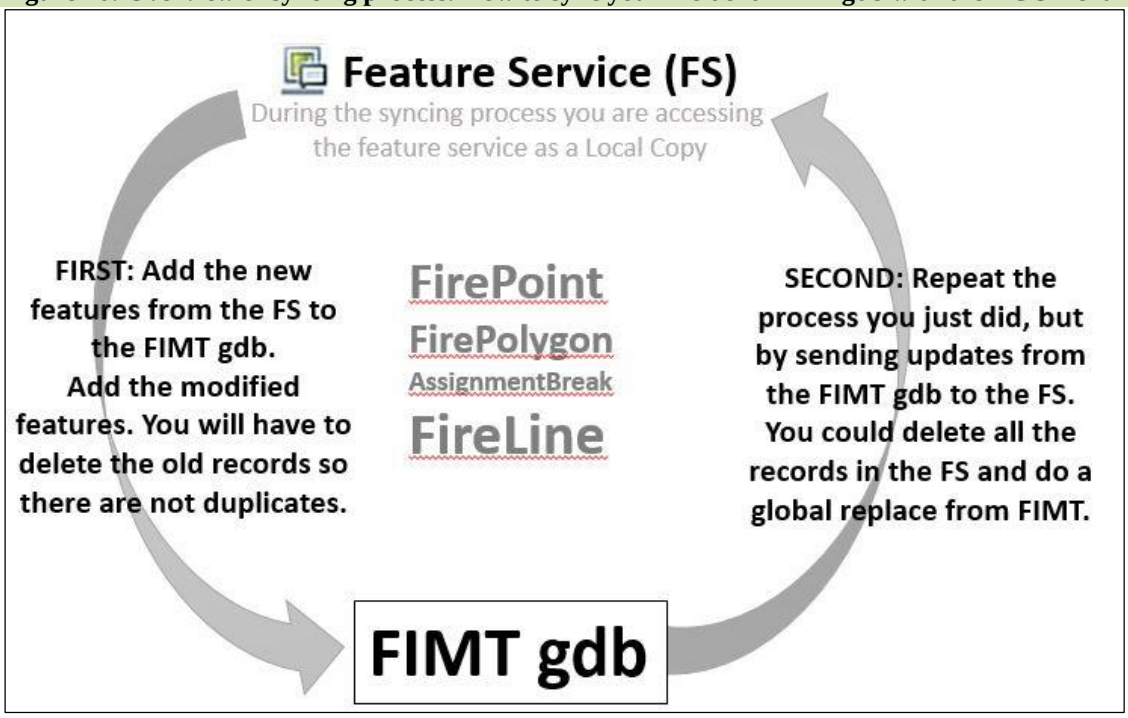
As your users sign in to their account for the first time, they will be prompted to change the password. I suggest telling folks what to use for this new password.

- The AGOL map you created is shared with a Group you choose. Collector users must be invited to the same Group to be able to view the map.
  - Best Practice: Do not require email authorization.
- With Editor Tracking enabled through ArcCatalog, editor names and dates are automatically recorded.
- Plan on giving a 5-10 minute tutorial to new Collector users.
  - Use the training video.
- Have Collectors use their maps in Offline mode so that they will have labels.
- Encourage users not to delete features. Use the Delete this Point to mark points and lines that need to be removed. Specific details should be provided as a comment in the Delete this Point table.

NOTE: In the table of a new feature there are Latitude/Longitude fields. If a Collector user enters coordinates here, the point will not be moved to that location.

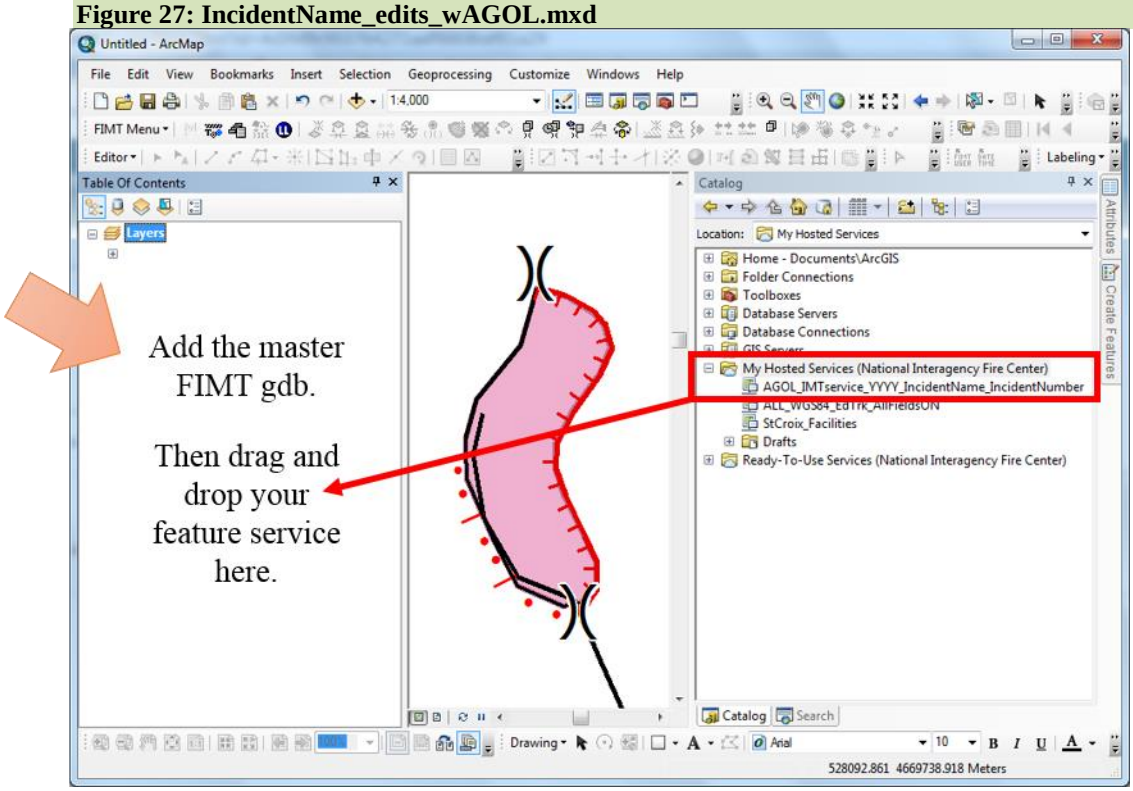
6.7 Syncing Data: Update the FIMT data

Figure 26: Overview of syncing process. How to sync your incident FIMT gdb with the AGOL changes.



6.7.1 **Open** (create) an mxd setup for editing: (if you save this mxd, you can reuse it each time you sync)

Figure 27: IncidentName_edits_wAGOL.mxd



NOTE: Backup gdbs before each edit session!

6.7.2 The following steps show how to add the new data/modifications:

Figure 28: Add your feature service to ArcMap. Do this by dragging and dropping from the Catalog window > My Hosted Services, into ArcMap.

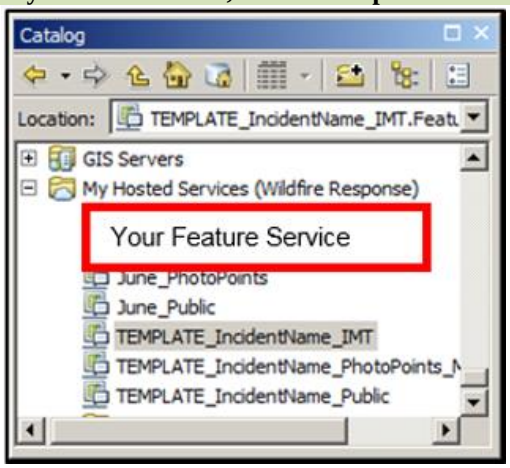


Figure 29: Edit the Incident through the FIMT toolbar.

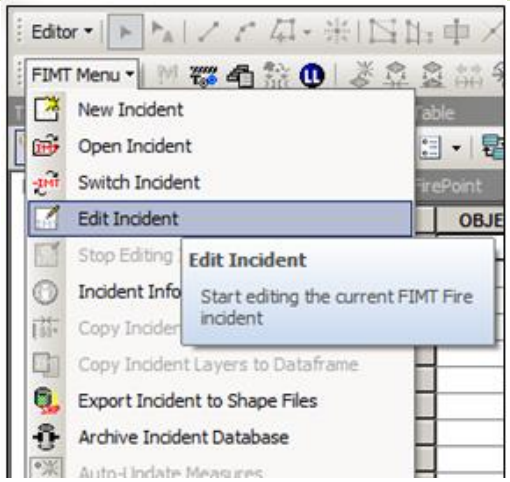
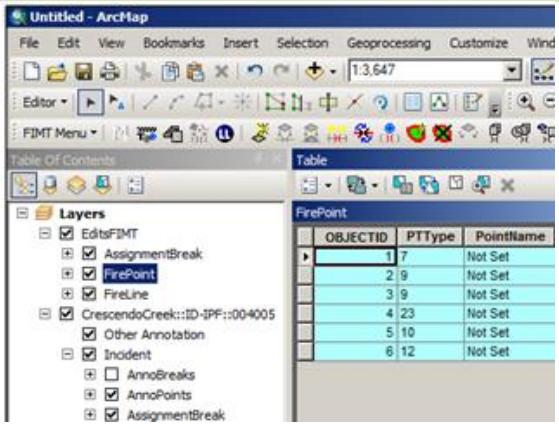


Figure 30: Open the table for the FirePoint feature service. Sort by last_edited_date to see what is new. Select new records.



NOTE: If the multiple layers with the same names are confusing, give one set a unique name.

Figure 31: With the editor arrow you will right click the highlighted items in the Data View. Copy & Paste. Select FirePoint as your target. [OK]

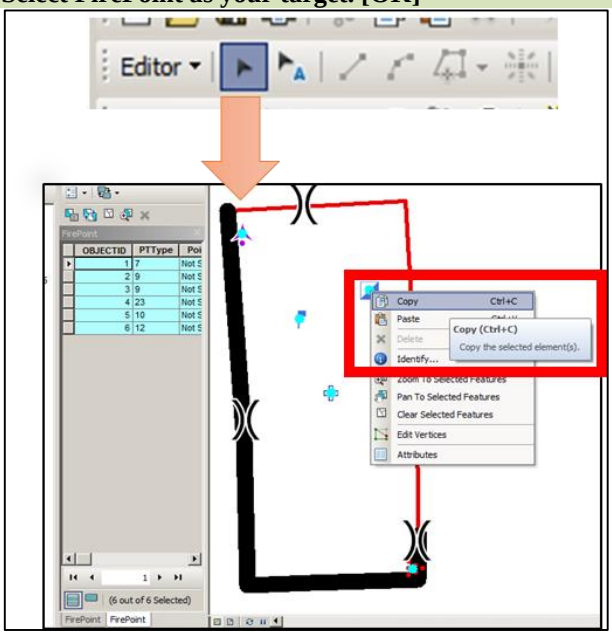
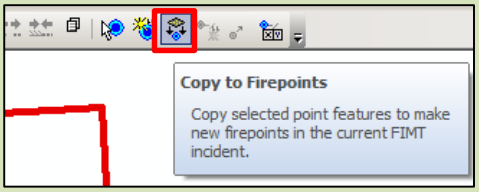


Figure 32: AssignmentBreaks: Add new AssignmentBreaks. Select all of the new breaks and copy/paste.

- **The sequence used to add the new FirePoints (Figure 29-30) will be used to add new FireLine.**

- Use special care with features that have been modified (geometry or attribute). These modified features will replace the original feature.
- When you copy-paste using the FIMT button 

, the PTType attribute comes across as UNKNOWN, and you have to manually change each field or will have to add each point manually using the FIMT 'Copy to FirePoints' button. **Using the steps above (Figure 28-32) allow you to bulk copy-paste.**
- Use the last_edited_date field to help you identify the changes that need to be added. If you want to query with 'Select by Attribute' this is the format you would use:
"last_edited_date" > date '2015-02-06 16:26:11'

6.7.3 Once you have updated the FIMT gdb, continue by adding any new data from the FIMT gdb to the Feature Service with the same technique.

NOTE: When there is a lot of data to move between the feature service and master FIMT gdb, consider copying one direction and then doing a global replace (delete all the records in the feature service, after the FIMT gdb is up to date, and then copy everything from the master FIMT gdb to the feature service).

NOTE: Another option would be to add new features to AGOL in situations where you have good, stable internet. Then you can replace/update your master gdbs from the AGOL data.

6.8 Syncing data: Update the Other data

In the last section edits that were made in AGOL/Collector were brought into ArcMap and added to the FIMT gdb and vice versa. This section shows how to add the changes that were done in ArcMap – in the master Other gdb → to the feature service.

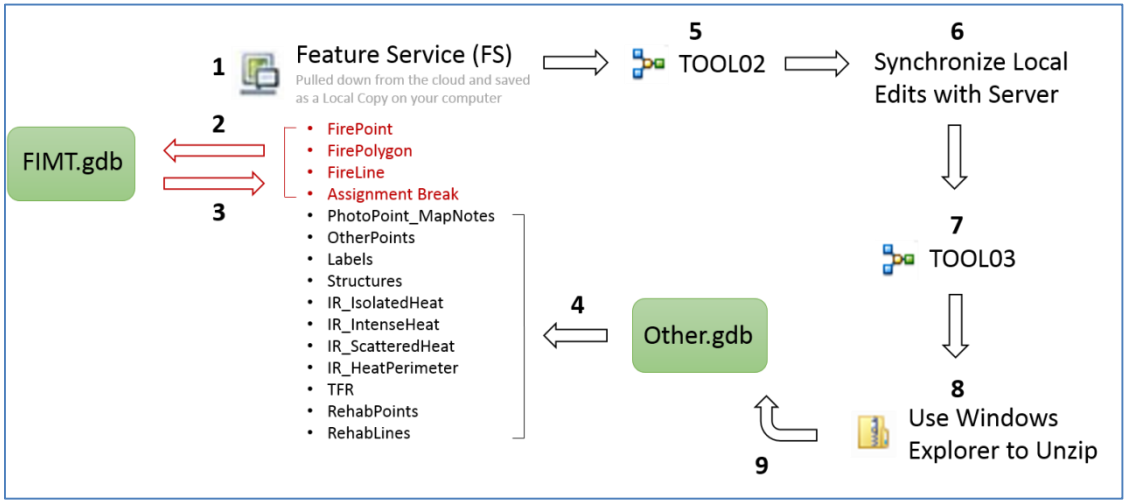


Figure 33: Overview of syncing the data from the Other gdb

1. Add Feature Service to ArcMap and create a Local Copy for Editing
2. Copy new data in the four red layers from the Local Copy of Feature Service to the FIMT.gdb
3. Copy new data created in the FIMT.gdb to Local Copy of Feature Service
4. Copy changes made in ArcMap to the Other.gdb and paste them to the Local Copy of the Feature Service
5. Save & Close mxd. Run TOOL02 on the Local Copy of the Feature Service to calculate the Lat and Long fields
6. Open mxd back up. Synchronize Local Edits with Server
7. Run TOOL03 to replicate the Feature Service
8. Use Windows Explorer to unzip the folder containing the replicated Feature Service
9. Replace the Other.gdb with the replicated Feature Service and rename it exactly as it was

6.8.1 In ArcMap, right click the header of the feature service: create Local Copy for Editing (Figure 34)

6.8.2 Right click a layer in the feature service > Edit Features > Start Editing

A. Use the last_edited_date field to find the most recent edits in the Other gdb
B. **Copy & Paste** the new features from the Other gdb to the feature service (ignore the FireLine, FirePoint, AssignmentBreak, & FirePolygon features in the Other gdb)

- Same as before, use special care with features that have been modified (geometry or attribute). These modified features will replace the original feature.

Figure 34: First you will Create a local copy for editing. Then make all of your edits.

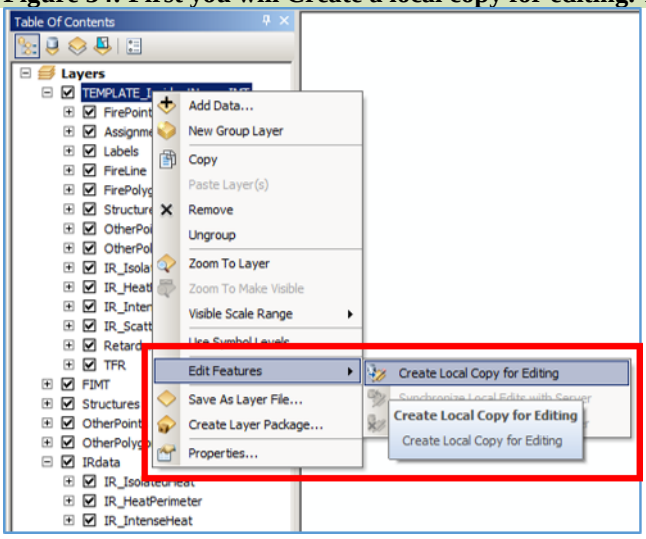
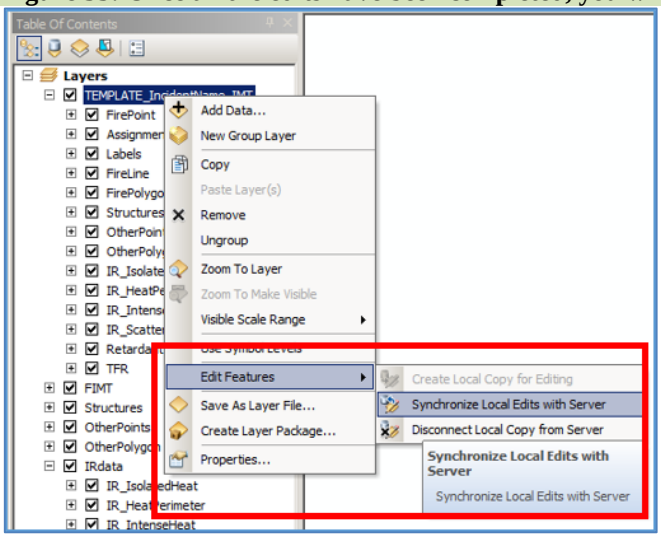


Figure 35: Once all the edits have been completed, you will Synchronize Local Edits with Server



6.8.3 Once all of the syncing is complete **Save** & **Stop** Editing. DO NOT 'Sync Local Edits with Server' YET.

6.8.4 In this step you will run: WorkFlow_Tools.tbx > TOOL02

1. The input will be the Local Copy you were just working with. Check the source of the Local Copy in ArcMap. The source will be in ArcGIS Default Location*: C:\Users\userName\Documents\ArcGIS \FeatureServiceLocalEdits.*
2. **Save** and **Close** ArcMap
3. **Run** TOOL02 now
   - *If you receive an error that the tool failed, ignore it. Check the Latitude Longitude fields of the point features to confirm that they have been calculated.*

6.8.5 Open back up the mxd you saved in section 6.8.4-(2)

6.8.6 Now: Synchronize Local Edits with Server (Figure 35)

- All of the features need to be visible in the Data View window to be synced with the feature service

6.8.7 **Create a backup** of the service using the WorkFlow_Tools.tbx > TOOL03-ReplicateService

- Find your URL/rest end point: go to the item details of your feature service in AGOL > click the arrow next to one of the layers listed > choose Service URL > Copy the URL in the web browser (include everything before '/FeatureService', e.g. exclude: '/0')

Figure 36: This tool will output a copy of the feature service as a file geodatabase in a zipped folder that is named with a date and time stamp.

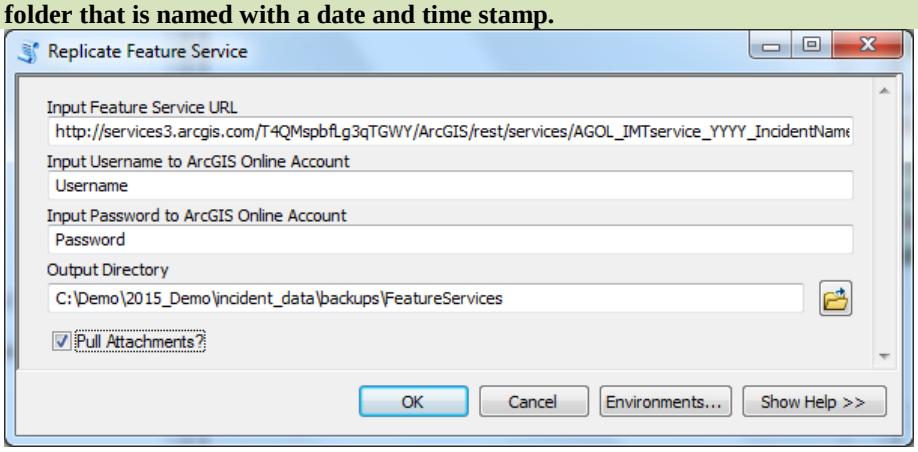
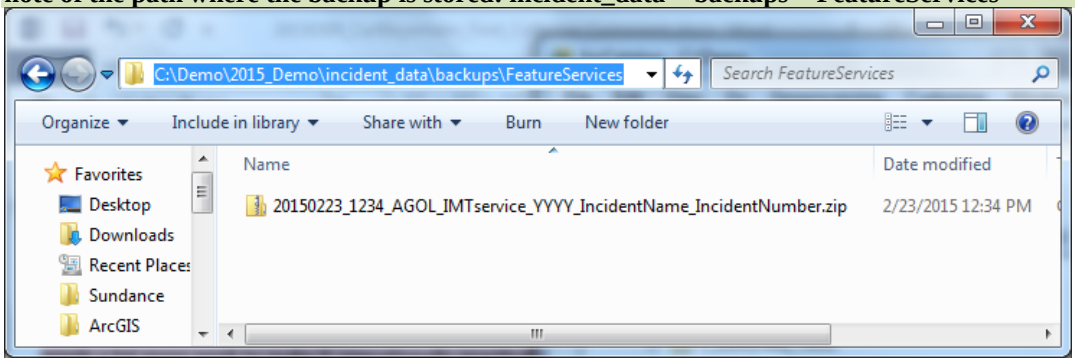


Figure 37: Use Windows Explorer to unzip the folder before you can view it in ArcMap/Catalog. Take note of the path where the backup is stored: incident_data > backups > FeatureServices



6.8.8 Make a **copy** of the gdb after you unzip the folder. The backup will have a crazy name: e.g. bc44dfa9acd1486d9e178c8c8fc87b2b.gdb

6.8.9 **Paste** it under the root of the **incident_data** folder

6.8.10 **Delete** the master Other gdb

6.8.11 **Rename** the copy you just pasted in (naming convention: YYYY_IncidentName_IncidentNumber_OTHER_Arc10.gdb)

6.8.12 To symbolize the OTHER feature classes, use the layer file: CollectorPilot_Workflow_Templates > LayerFiles > Other_ALL.lyr

- Re-source these symbolized layers to your master OTHER gdb

NOTE: You will repeat this process whenever you have new information in the feature service.

7 Tile Packages (tpks) – Side loading basemaps

Create tpks using Collector or ArcMap in advance. Side load these on to a Collector user's device.

> **NOTE:** Consider making tpks for your incident before you leave for it. When you arrive at ICP you will be ready to start sideloading the tpks and save download time.

7.1.1 Create a tpk using Collector

- Make a map in AGOL. Open it in Collector and download for Offline use. During the download process:
  - Download a new basemap
  - Choose your work area: Eye-ball a ~50x50mi area around the fire (or your best judgment according to the direction the fire is burning).
  - Choose map detail (topos go to about 1:18,000 & ortho to about 1:4,000)
- Once the map is done downloading you will need to connect the device to your computer to retrieve the basemap:
  - For iOS use the iTunes Store
  - For Android, load them to the Collector folder, like your device is an external drive.
- Rename the tpks
- Load the basemaps to other devices with the same procedure as when you were retrieving them.

> **NOTE:** Tile packages are supported from ArcGIS 10.1 for Desktop onwards. Tile package will fail to open with older ArcGIS for Desktop versions (10 or older).

- More details: Using Your own Basemaps layers with Collector[32]

7.1.2 Create a tpk through ArcMap.

The only map service you can create a TPK with through ArcMap is OpenStreet. You will need your own DRG or Ortho rasters.

- Add the raster of your choice to ArcMap
- In ArcMap enable: Customize > ArcMap Options > Sharing Tab > ☑ Enable ArcGIS Runtime Tools.
- Add your imagery or layers to ArcMap
- File > Share As > Tile Package…(Figure 38)
- Tile Package: where to Save; Tile Format: Tiling Scheme, Tile Format, Level of Detail; and Item Description: Summary, Tags, Description (Figure 39)

32 http://blogs.esri.com/esri/arcgis/2014/03/23/using-your-own-basemap-layers-with-collector-for-arcgis/

Figure 38

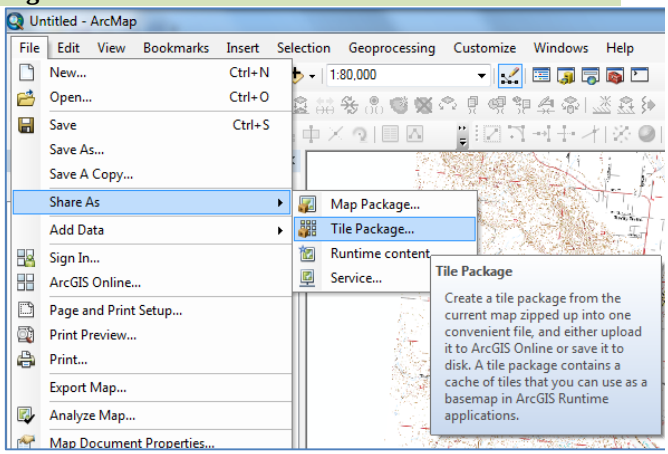
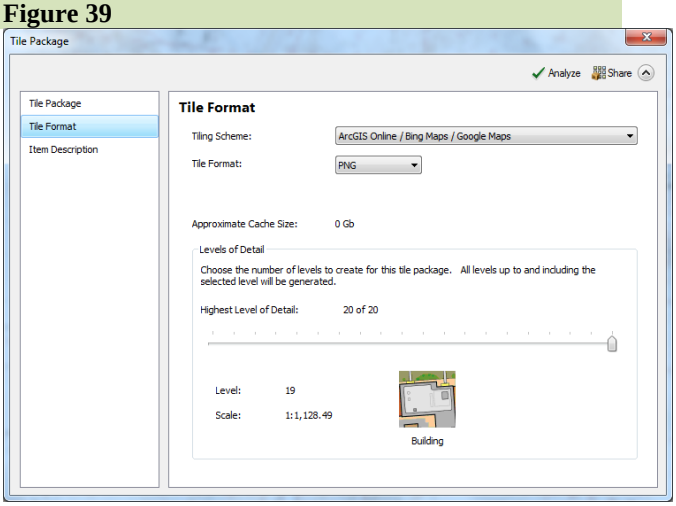


Figure 39



8 Transition

8.1 How AGOL will be transitioned between teams.

Before the transition happens copies should be made of the hosted feature services and they should be placed in a dated incident data folder.

During transition, any data that is going to an incoming IMT, would be transferred via the administration tools by changing owner and group. For more details or assistance contact wildfireresponse@gmail.com.

9 Additional Information

9.1.1 Request Assistance:

- http://www.esri.com/services/disaster-response

9.1.2 Best Practices :: GPS & Preserving Battery Life

- It is recommend that people turn off location settings for everything except Collector and the camera and that they review fetch/push settings for things like mail, dim the brightness, and turn off notifications.
- Use a mobile battery pack.
- Charge your phone in your vehicle whenever you are in it.
- Reference these links:
  - http://www.pcmag.com/article2/0,2817,2367542,00.asp
  - http://ipod.about.com/od/iphone3g/tp/iphone-battery-life.htm
  - http://www.zdnet.com/pictures/31-ways-to-improve-your-iphones-battery-life/
  - http://www.cnet.com/how-to/how-to-get-better-battery-life-on-android/

9.1.3 Attachments Workflow:

- Attachments will only be enabled on PhotoPoints_MapNotes. (a GlobalID field is included in this feature)
- How do I download attachments out of AGOL? *[ArcGIS for Desktop 10.2 will support "Creating a local copy" of the service that will also contain the attachments. (ESRI Help)]*
- Python script available to download multiple attachments.

9.1.4 Things to be aware of:

- If you have downloaded a map on your mobile device and you need to update it with the AGOL copy, go to your main **My Maps** page in Collector and re-sync to get updates.
- If you are out of service and are forced to re-sign back in, you may not be able to.

9.1.5 Trouble Shooting:

- Sign out of Collector App and sign back in.
- Restart App &/or mobile device.
- Issues logging into AGOL:
  - http://support.esri.com/en/knowledgebase/techarticles/detail/40178
  - And Icon in task bar: http://gis.stackexchange.com/questions/108365/arcgis-online-and-sign-in-options-are-greyed-out-in-arcmap-10-2-2

9.1.6 Location Tracking:

- Create a Location Tracking feature using the 'Create Layer' option
- Add to a map and disable its Editing
- You can enable how often it tracks in the settings for the map.

9.1.7 My Favorites:

- Save different services that you frequently use or that interest you.
- Item Details – Add to Favorites[33]

33 http://doc.arcgis.com/en/arcgis-online/share-maps/item-details.htm

- Consider adding: basemaps (for export), other layers, and templates so you can quickly add them to any map.

9.1.8 Route/Direction Layer:

If you are signed in with an organizational account, you can use the map viewer to get directions[34] and add the route as a layer in your map. You must have privileges to create items in order to save the map with the route layer. You can configure the layer, create a route map, and perform analysis on the route. Your route map is like any other map you create with the map viewer—you can configure it, share it through a web app, story template, blog, and so on, and use it in a map client such as an iOS device, Android phone, and ArcGIS for Desktop.

1. Open the map viewer and click **Directions** to display the **Directions** panel to the left of the map.
2. Get directions[35] by adding an origin and one or more destinations.
3. Once you get your directions, click **Add as Layer**.
4. To add an additional route, create a new set of directions and add that layer to your map. Each route appears as a layer in the **Contents** of your map.
5. If you have privileges to create items, save your map.
   The route layer is stored in the map; it is not an independent layer you can reuse in other maps. If you perform analysis on the route[36], you create a hosted feature layer as a result of the analysis. This hosted feature layer is an independent layer you can reuse in other maps.

9.1.9 Dashboard – discover more at: http://doc.arcgis.com/en/operations-dashboard/windows-desktop/author/create-a-map.htm

9.1.10 Explorer App – discover more at: http://doc.arcgis.com/en/explorer/

34 http://doc.arcgis.com/en/arcgis-online/use-maps/get-directions.htm
35 http://doc.arcgis.com/en/arcgis-online/use-maps/get-directions.htm
36 http://doc.arcgis.com/en/arcgis-online/use-maps/perform-analysis.htm

10 Glossary/Terminology

- AGOL: ArcGIS Online
- FIMT: Fire Incident Mapping Tool, http://gis.nwcg.gov/links_tools.html
- GISS: Geographic Information Systems Specialist
- GSTOP: GIS Standard Operating Procedure, http://gis.nwcg.gov/gstop_sop.html
- IMT: Incident Management Team
- Hosted Feature Service: also referred to as 'feature service' or 'service'
- Local Copy: feature service in ArcMap after you right click the header and create a Local Copy
- Rest End Point
- Service Definition
- Group
- Synchronize
- AGOL Map
- Basemap
- Tile Package (tpk)
- IMT Service
- AGOL Layer

11 Appendix

11.1 A zipped folder contains the needed templates:

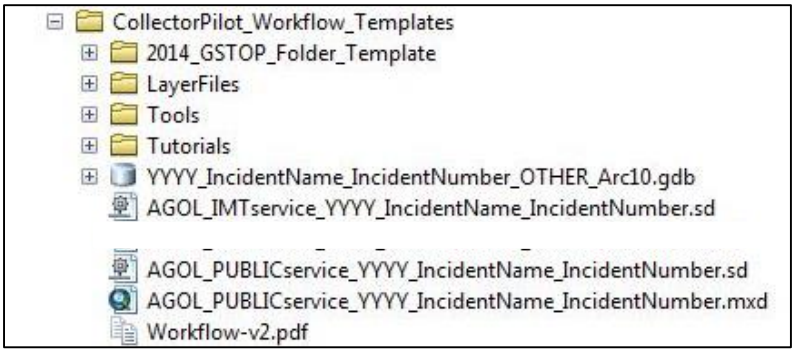
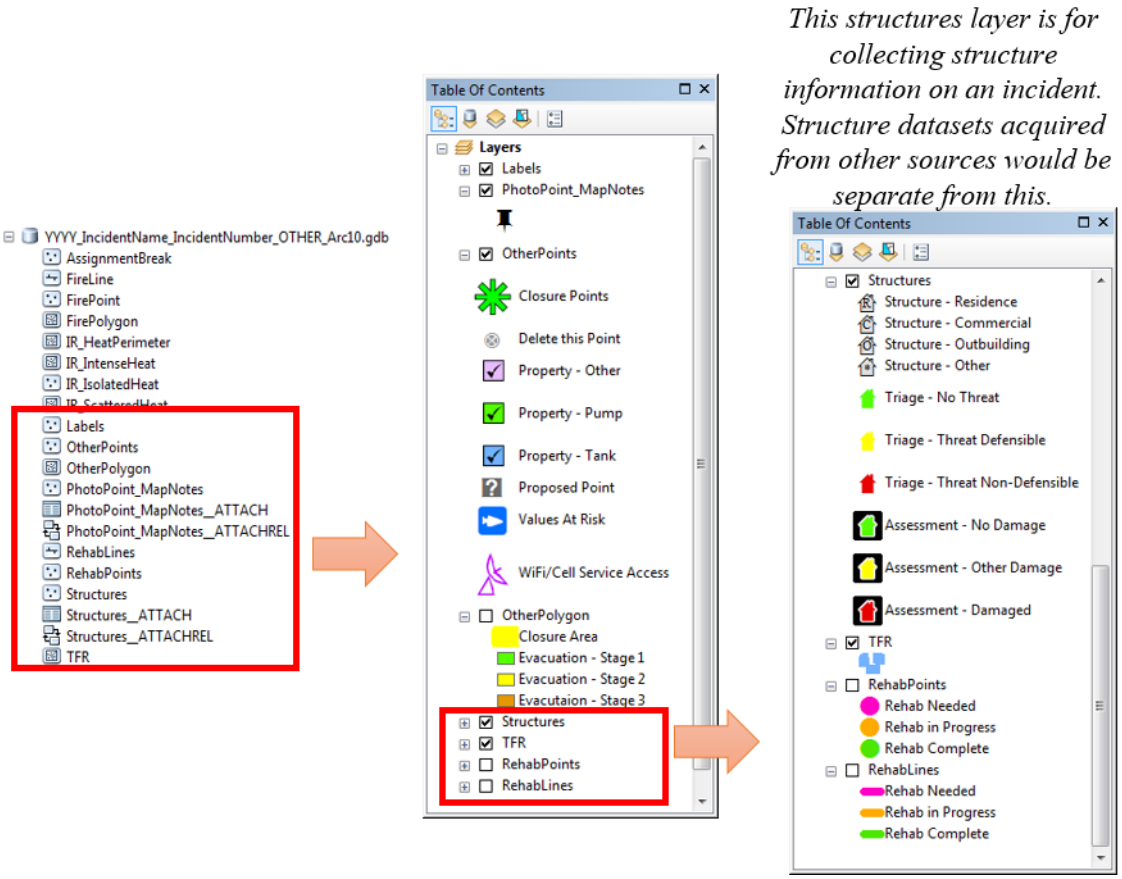


Figure 40: Screen shot of templates folder that will be downloaded.

11.2 Features in the 'Other' feature dataset:



11.3 Figure 10 Notes

These are the different options you can enable during the publishing of a feature service from ArcMap. They are the operations that will be allowed for that feature service. An IMT service would enable all of the operations, where a Public service would only allow query or none.

Choose what level of access connecting users should have to the features in the feature service. You can choose as many of the following options as apply:

- **Query**: Connecting users can view and select features from the feature classes in the feature service.
- **Create**: Connecting users who have the necessary database privileges can add features to feature classes in the feature service.
- **Delete**: Connecting users who have the necessary database privileges can delete features from feature classes in the feature service.
- **Update**: Connecting users who have the necessary database privileges can edit existing features in the feature classes in the feature service. (ESRI Resources)

11.4 AGOL Roles

Listed are the three main roles. Role privileges work in AGOL and Collector (Online) mpas. When a Collector map is taken Offline, these privilege, or lack of, become obsolete and any user can edit the map. This is where the Groups come into play to inforce these editing restrictions.

GISS:	Operations:
Description: GISS Assigned Staff **Role Privileges:** ▪ Create, update, and delete groups ▪ Join organization groups ▪ Join external groups ▪ Create, update, and delete content ▪ Publish hosted feature layers ▪ Share content with groups ▪ Share content with organization ▪ Share content with public ▪ Make groups visible to organization ▪ Spatial Analysis ▪ GeoEnrichment	**Description:** Operations Group Staff **Role Privileges:** ▪ Join organization groups ▪ Join external groups ▪ Create, update, and delete content ▪ Edit features ▪ View all organization groups ▪ View all organization content
Data Editor:	Data Viewer:
Description: Ability to view and edit feature service data **Role Privileges:** ▪ Join organization groups ▪ Edit features	**Description:** View Only abilities - no editing **Role Privileges:** ▪ Join organization groups
User:	
Description: Users can create maps, add items, share content, and create groups.	

11.5 Tools

Tools

- Other
  - ExportAttachments_from_FGDB.tbx
  - ExportAttachments: *this will pull the attachments out of a file geodatabase stored locally and put copies into a folder of your choice*
  - Restservices_Toolbox.pyt
  - Pull Attachments: *this tool can be run to batch download attachments from AGOL*
  - Replicate Feature Service: *this will download a copy of your feature service as gdb in a zipped folder (Used in TOOL03)*
  - Update Service: *Update records in a feature layer with changes in a CSV table.*
- WorkFlow_Tools.tbx
- CalcLatLong: *Used in TOOL02 (ignore)*
- SubModel: *Used in TOOL01 (ignore)*
- TOOL01: *Modifies the FIMT gdbs schema*
- TOOL02-Calculate Latitude-Longitude: *Calculates Latitude-Longitude fields in degrees decimal minutes (DDM) format*
- TOOL03-Replicate Service: *Creates a backup of your service directly from AGOL to your desktop.*
- LineConstructionMethod.csv

11.6 Disclaimer (Optional)

This is an example of a Sensitive Data Map Disclaimer. It may be duplicated for use or modified to meet the needs of the incident.

PROTECTED INFORMATION - NOT FOR PUBLIC RELEASE

This map contains information about historic and/or prehistoric cultural resources that may be withheld under section 304 of the National Historic Preservation Act of 1966, or under section 9 of the Archaeological Resources Protection Act of 1979. Do not copy or distribute this information. Abuse may result in fines and/or imprisonment.